

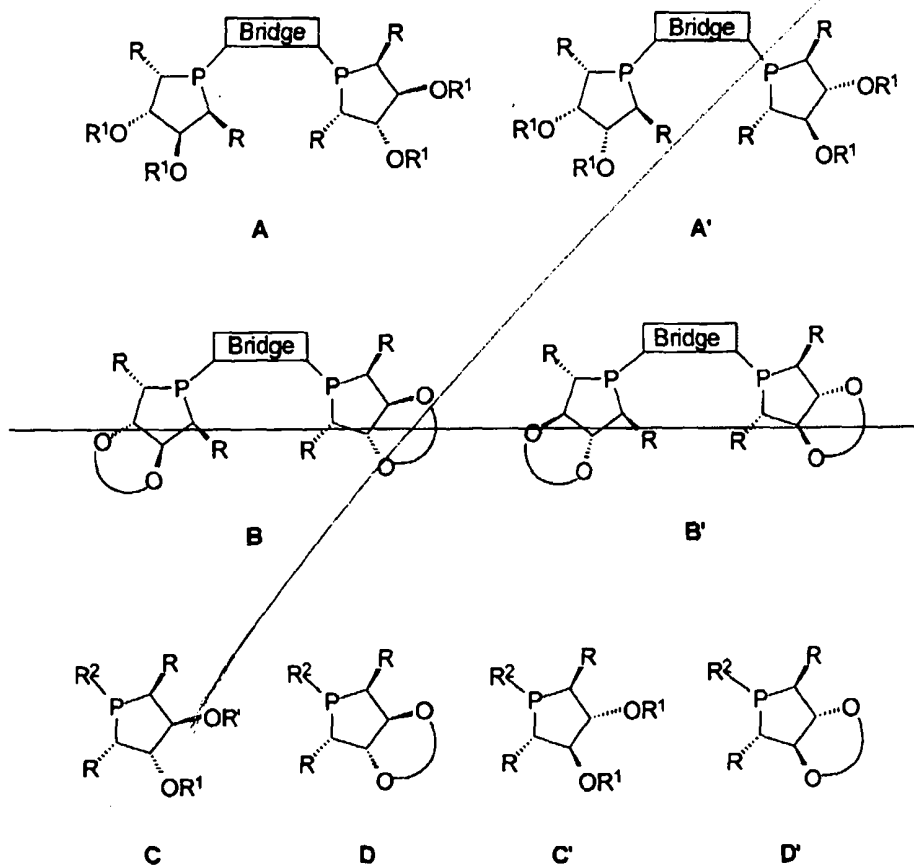
## Amendments to the Claim

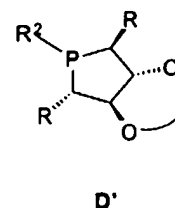
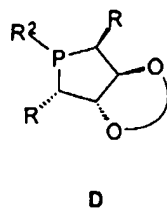
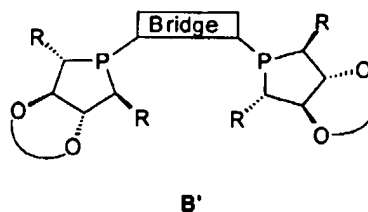
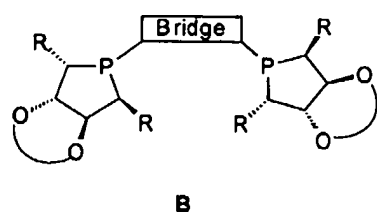
This listing will replace all prior versions and listings of claims in the application:

### Listing of Claims


Claims 1-22 (withdrawn)  $\rightarrow$  canceled 10/24/02 40

Claim 23. (currently amended) A catalyst comprising a chiral compound in the form of a complex with a transition metal wherein said compound is ~~selected from~~ compounds represented by the formula B, B', D, D' or the corresponding enantiomers:





wherein:

- a) R and R<sup>2</sup> are independently aryl, alkyl, alkyl aryl, aryl alkyl, or chiral oxazolino which may be substituted with carboxylic acid, alkoxy, hydroxy, alkylthio, thiol or dialkylamino groups;
- b) ~~R<sup>1</sup> can be H, alkyl, silane, aryl, a water soluble unit, or a linked polymer chain or inorganic support; and the ring component~~  ~~O represents a protected diol, a crown ether linkage, -O-alkyl-O- wherein the alkyl group is linked to a polymer, or -O-(CH<sub>2</sub>CH<sub>2</sub>-O)<sub>n</sub>- wherein n is an integer ranging from 1 to 8 and the methylene groups are optionally substituted by C1-C8 alkyl;~~
- c) in formulas B and B', the Bridge may be:

$-(CH_2)_n-$  where n is an integer ranging from 1 to 8;

$-(CH_2)_nX(CH_2)_m-$  wherein n and m are each integers, the same or different, ranging from 1 to 8, and X is O, S,  $NR^4$ ,  $PR^4$ ,  $AsR^4$ ,  $SbR^4$ , divalent aryl, divalent fused aryl, divalent 5-membered ring heterocyclic group, or divalent fused heterocyclic group, wherein  $R^4$  is aryl, alkyl, substituted aryl, or substituted alkyl; or

1,2-divalent phenyl, 2,2'-divalent 1,1'-biphenyl or 2,2'-divalent 1,2'-binaphthyl or ferrocene, each of which may be substituted with aryl, C1-C8 alkyl, F, Cl, Br, I,  $COOR^5$ ,  $SO_3R^5$ ,  $PO_3R^5$ ,  $OR^5$ ,  $SR^5$ ,  $NR^5_2$ ,  $PR^5_2$ ,  $AsR^5_2$ , or  $SbR^5_2$ ;

wherein the substitution on 1,2-divalent phenyl, the ferrocene or biaryl bridge can be independently halogen, alkyl, alkoxy, aryl, aryloxy, nitro, amino, vinyl, substituted vinyl, alkynyl, or sulfonic acids; and

$R^5$  is ~~hydrogen~~, C1-C8 alkyl, C1-C8 fluoroalkyl, or C1-C8 perfluoroalkyl, aryl; substituted aryl; arylalkyl; ring-substituted arylalkyl; or  $-CR^3_2(CR^3_2)_qX(CR^3_2)_pR^1$  wherein q and p are integers, the same or different, ranging from 1 to 8;  $R^3$  is aryl, alkyl, substituted aryl, or substituted alkyl; and X is as defined above.

Claim 24. (original) A catalyst according to claim 23, wherein the transition metal is rhodium, iridium, ruthenium, nickel, or palladium.

Claim 25. (currently amended) A catalyst according to claim 24, wherein said transition metal complex is formed from a compound ~~is a complex with a compound~~ selected from the group consisting of:  $Pd_2(DBA)_3$ ,  $Pd(OAc)_2$ ,  $[Rh(COD)Cl]_2$ ,  $[Rh(COD)_2]X$ ,  $Rh(acac)(CO)_2$ ,  $RuCl_2(COD)$ ,  $Ru(COD)(methylallyl)_2$ ,  $Ru(Ar)Cl_2$ , wherein Ar is an aryl group, unsubstituted or substituted with an alkyl group;  $[Ir(COD)Cl]_2$ ,  $[Ir(COD)_2]X$ ; and  $Ni(allyl)X$ ; wherein X is a counterion.

Claim 26. (original) A catalyst according to claim 25, wherein X is selected from the group consisting of:  $F^-$ ,  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $BF_4^-$ ,  $ClO_4^-$ ,  $SbF_6^-$ ,  $CF_3SO_3^-$ , and  $PF_6^-$ .

Claim 27. (original) A catalyst according to claim 26 wherein X is  $PF_6^-$ .

Claim 28. (original) A catalyst according to claim 24 wherein the transition metal is Ru or Rh.

Claim 29. (original) A catalyst according to claim 28 wherein the transition metal is Rh.

Claim 30. (currently amended) A catalyst according to claim 23, wherein said transition metal complex is formed from a compound selected from the group consisting of: the catalyst comprises: Ru(RCOO)<sub>2</sub>(diphosphine), RuX<sub>2</sub>(diphosphine), Ru(methylallyl)<sub>2</sub>(diphosphine), Ru(aryl group)X<sub>2</sub>(diphosphine), Rh(RCOO)<sub>2</sub>(diphosphine), RhX<sub>2</sub>(diphosphine), Rh(methylallyl)<sub>2</sub> diphosphine, or Rh(aryl group)X<sub>2</sub> (diphosphine) and X is halogen.

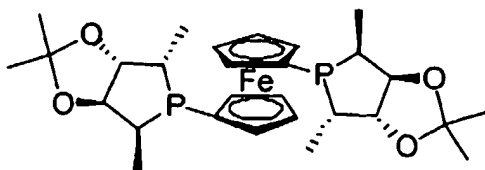
Claim 31. (canceled)

Claim 32. (canceled)

Claim 33. (canceled).

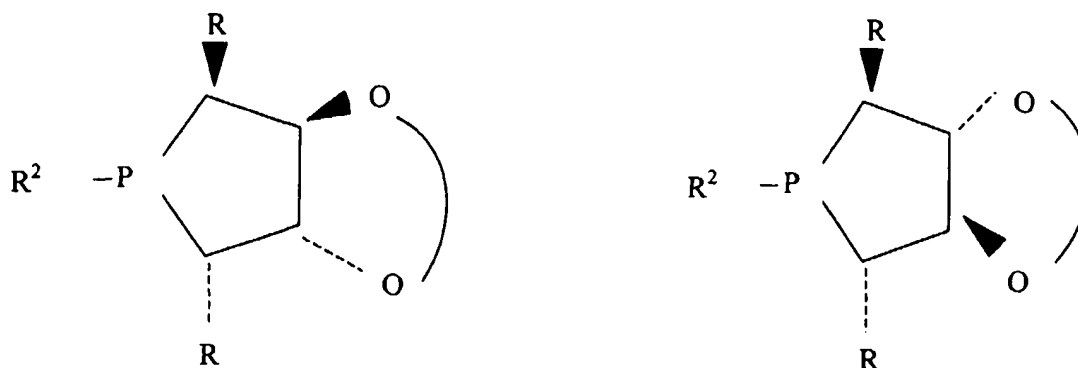
Claim 34. (canceled)

Claim 35. (Previously presented) A catalyst according to claim 23, wherein said chiral compound is represented by the following formula:



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Claim 36. (currently amended) A catalyst according to claim 23 comprising a transition metal complex of a compound of the following formula or its enantiomer:



wherein

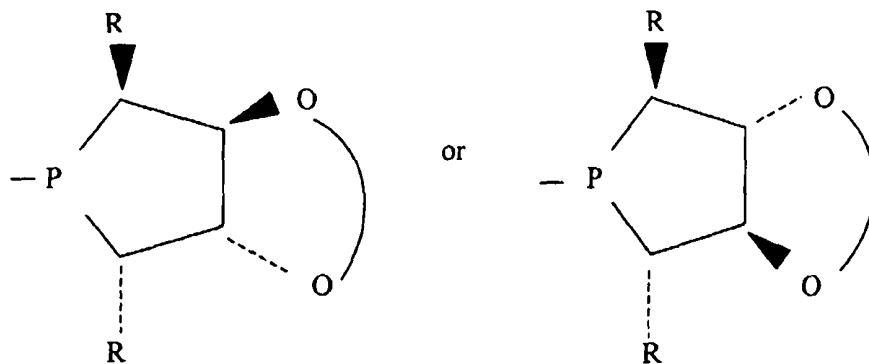
- A) R is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>1</sub>-C<sub>8</sub> alkyl aryl, aryl C<sub>1</sub>-C<sub>8</sub> alkyl, aryl, each of which may be substituted with carboxylic acid, alkoxy, hydroxy, alkylthio, thiol, dialkylamino, diphenylphosphino or chiral oxazoline; and
- B) the ring component  $\widehat{\text{O}-\text{O}}$  represents a protected diol, a crown ether linkage, -O-C<sub>1</sub>-C<sub>8</sub> alkyl-O- wherein the alkyl group is linked to a polymer, -O-(CH<sub>2</sub>CH<sub>2</sub>)<sub>n</sub>-O- wherein n is an integer ranging from 1 to 8 and the methylene groups are optionally substituted by C<sub>1</sub>-C<sub>8</sub> alkyl, or O-W-O, where W is BR<sup>9</sup>, POR<sup>9</sup>, PO(OR<sup>9</sup>)<sub>i</sub>, SO<sub>2</sub>, CO, or Si(R<sup>9</sup>)<sub>2</sub>; where R<sup>9</sup> is C<sub>1</sub>-C<sub>8</sub> alkyl, aryl, C<sub>1</sub>-C<sub>8</sub> alkyl aryl, or aryl C<sub>1</sub>-C<sub>8</sub> alkyl, alkoxy, hydroxy, alkylthio, thio, alkylamino, dialkylamino; and
- C) R<sup>2</sup> is either R, H, phenyl or a symmetrical bidentate structure having the formula



wherein BRIDGE is

- i)  $-(CH_2)_n-$  where  $n$  is an integer from 1 to 8; or
- ii)  $-(CH_2)_n X (CH_2)_m-$  where  $n$  and  $m$  are the same or different integers from 1 to 8, and  $X$  is O, S,  $NR^4$ ,  $PR^4$ ,  $AsR^4$ ,  $SbR^4$ , divalent aryl, divalent fused aryl, divalent 5-membered heterocyclic ring, or divalent fused heterocyclic ring, where  $R^4$  is  $C^1$ - $C^8$  alkyl, aryl, substituted aryl, or substituted alkyl; or
- iii) 1, 2-divalent phenyl, 2, 2'-divalent 1, 1'-biphenyl, 2,2'-divalent, 1,1' binaphthyl, or ferrocene, each of which may be substituted independently with  $C_1 - C_8$  alkyl or aryl, F, Cl, Br, I,  $COOR^5$ ,  $SO_3R^5$ ,  $PO_3R^5_2$ ,  $OR^5$ ,  $SR^5$ ,  $NR^5_2$ ,  $PR^5_2$ ,  $AsR^5_2$ ,  $SbR^5_2$ , nitro, vinyl, substituted vinyl, alkynyl wherein  $R^5$  is H,  $C_1$ - $C_8$  alkyl, substituted  $C_1$ - $C_8$  alkyl,  $C_1$ - $C_8$  fluoroalkyl,  $C_1$ - $C_8$  perfluoroalkyl, aryl or substituted aryl; and

wherein Z is a compound selected from the group of compounds having the following formulas and their corresponding enantiomers:



Claims 37-42 (withdrawn)  $\rightarrow$  canceled to 10/29/03

Claim 43. (new) A catalyst according to claim 36, wherein the transition metal is rhodium, iridium, ruthenium, nickel, or palladium.

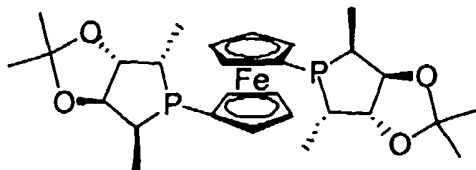
Claim 44. (new) A catalyst according to claim 36, wherein said transition metal complex is formed from a compound selected from the group consisting of:

$\text{Pd}_2(\text{DBA})_3$ ,  $\text{Pd}(\text{OAc})_2$ ;  $[\text{Rh}(\text{COD})\text{Cl}]_2$ ,  $[\text{Rh}(\text{COD})_2]\text{X}$ ,  $\text{Rh}(\text{acac})(\text{CO})_2$ ;  $\text{RuCl}_2(\text{COD})$ ,  $\text{Ru}(\text{COD})(\text{methylallyl})_2$ ,  $\text{Ru}(\text{Ar})\text{Cl}_2$ , wherein Ar is an aryl group, unsubstituted or substituted with an alkyl group;  $[\text{Ir}(\text{COD})\text{Cl}]_2$ ,  $[\text{Ir}(\text{COD})_2]\text{X}$ ; and  $\text{Ni}(\text{allyl})\text{X}$ ; wherein X is a counterion selected from the group consisting of:  $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{BF}_4^-$ ,  $\text{ClO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ , and  $\text{PF}_6^-$ .

Claim 45. (new) A catalyst according to claim 36, wherein said transition metal complex is formed from a compound selected from the group consisting of:

$\text{Ru}(\text{RCOO})_2(\text{diphosphine})$ ,  $\text{RuX}_2(\text{diphosphine})$ ,  $\text{Ru}(\text{methylallyl})_2(\text{diphosphine})$ ,  $\text{Ru}(\text{aryl group})\text{X}_2(\text{diphosphine})$ ,  $\text{Rh}(\text{RCOO})_2(\text{diphosphine})$ ,  $\text{RhX}_2(\text{diphosphine})$ ,  $\text{Rh}(\text{methylallyl})_2$  diphosphine, or  $\text{Rh}(\text{aryl group})\text{X}_2$  (diphosphine) and X is halogen.

Claim 46. (new) A catalyst according to claim 36, wherein said compound is represented by the following formula:



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wherein said transition metal is rhodium, iridium, ruthenium, nickel or palladium;  
 and wherein said transition metal complex is formed from:  $\text{Pd}_2(\text{DBA})_3$ ,  $\text{Pd}(\text{OAc})_2$ ;  
 $[\text{Rh}(\text{COD})\text{Cl}]_2$ ,  $[\text{Rh}(\text{COD})_2]\text{X}$ ,  $\text{Rh}(\text{acac})(\text{CO})_2$ ;  $\text{RuCl}_2(\text{COD})$ ,  $\text{Ru}(\text{COD})(\text{methylallyl})_2$ ,  
 $\text{Ru}(\text{Ar})\text{Cl}_2$  wherein Ar is an aryl group unsubstituted or substituted with an alkyl group,  
 $[\text{Ir}(\text{COD})\text{Cl}]_2$ ,  $[\text{Ir}(\text{COD})_2]\text{X}$  or  $\text{Ni}(\text{allyl})\text{X}$ , wherein X is a counterion selected from the group  
 consisting of:  $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{BF}_4^-$ ,  $\text{ClO}_4^-$ ,  $\text{SbF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ , and  $\text{PF}_6^-$ ; or  
 $\text{Ru}(\text{RCOO})_2(\text{diphosphine})$ ,  $\text{RuX}_2(\text{diphosphine})$ ,  $\text{Ru}(\text{methylallyl})_2(\text{diphosphine})$ ,  $\text{Ru}(\text{aryl}$   
 $\text{group})\text{X}_2(\text{diphosphine})$ ,  $\text{Rh}(\text{RCOO})_2(\text{diphosphine})$ ,  $\text{RhX}_2(\text{diphosphine})$ ,  $\text{Rh}(\text{methylallyl})_2$   
 $\text{diphosphine}$  or  $\text{Rh}(\text{aryl group})\text{X}_2(\text{diphosphine})$ , wherein X is halogen.